



# Australian Bureau of Statistics

## Education Services

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### Resources



### MAT 02 – Water - Use It Wisely

You can download this activity, the teacher solutions and the assessment rubric as a rich text file (RTF) at the bottom of the page.

#### Subject Area

Mathematics

#### Overview

This activity focuses on how Australians use water. State/territory comparisons are made between water use and where the water is used in the household. Students will need to make some simple calculations to make these comparisons. An extension exercise is also provided where students solve a set of equations to estimate the potential for water wastage.

#### Requirements

- Calculator
- Optional: Internet connection, Computer with spreadsheet software program (e.g. Excel)

#### Instructions

#### Calculating the Actual Volume of Water Used

Volume of household water used per capita (kL) 1993-94 – 2011-12

|             | ACT | NSW | NT  | Qld | SA  | Tas. | Vic. | WA  |
|-------------|-----|-----|-----|-----|-----|------|------|-----|
| 1993-94 (a) | np  | np  | 194 | 131 | 89  | 67   | 93   | 126 |
| 1996-97 (a) | 115 | 96  | 172 | 124 | 92  | 69   | 96   | 124 |
| 2000-01 (b) | 115 | 97  | 162 | 143 | 110 | 125  | 97   | 191 |
| 2004-05 (b) | 95  | 84  | 153 | 124 | 94  | 143  | 81   | 180 |
| 2008-09 (c) | 76  | 78  | 173 | 79  | 80  | 137  | 62   | 150 |
| 2009-10 (c) | 77  | 78  | 161 | 81  | 76  | 143  | 59   | 152 |
| 2010-11 (c) | 68  | 73  | 134 | 69  | 70  | 135  | 56   | 132 |
| 2011-12 (c) | 69  | 70  | 145 | 76  | 72  | 109  | 56   | 127 |

'Per capita' is another term for 'per person'.

Np – not available for publication

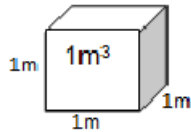
**Source:**

(a) Australian Bureau of Statistics, Water Account, Australia 2000-01, Table 9.6 (cat no. 4610.0)

(b) Australian Bureau of Statistics, Water Account, Australia 2004-05, Table 7.7 (cat no. 4610.0)

(c) Australian Bureau of Statistics, Water Account, Australia 2011-12, Summary Tables, Table 1 (cat no. 4610.0)

1. Draw a side-by-side column graph showing the volume of water consumed by each household, by state or territory by year. Include all years on one graph, using a different colour for each year.
2. Comment on the change in the volume of water use over time.
3. Graph the data in Table 1 using a display different to a side by side column graph. Label the graph and axes appropriately. Comment on the advantages and disadvantages of displaying data two different ways.



4. A kilolitre is the amount of water that would fill in one cubic metre (1m x 1m x 1m).

Using 2011-12 data for your own state or territory in table 1, show the total amount of water used as a cube with dimensions correct to 1 decimal place. For comparison draw a scale drawing of yourself next to the cube.

5. Based on all the information, create a list of suggestions that will help reduce water use.

## Extension

### Task One

6. With a partner, list ways that water is wasted around the home. Suggest solutions to decrease this waste.

## Task Two: Brushing Teeth

How much water is wasted per person in a year if they leave the tap running while they brush their teeth?

7. Complete steps 1 - 4 (below) as homework.

**Step 1:** Time how long it takes to brush your teeth in seconds. Call this  $t_b$ .

$t_b = \underline{\hspace{2cm}}$  seconds

**Step 2:** Time how long it takes to fill a 1 litre (L) container at your bathroom sink (please use this water wisely). Call this  $t_f$ . (Hint: make sure you have the tap running at a normal flow)

$t_f = \underline{\hspace{2cm}}$  seconds

**Step 3:** Calculate the flow rate in L per second.

Flow rate =  $1/t_f = \text{L per second}$

**Step 4:** Calculate the water wasted by multiplying the flow rate by the time it takes to brush your teeth.

Water wasted =  $t_b \times \text{flow rate} = \text{L}$

## Questions

8. If a person brushes their teeth twice a day and leaves the tap running while doing so, calculate how much water will be wasted over a week, a month and a year? Do the same calculation for a family of four.

9. Using the same volume as in question 4, calculate the possible dimensions of the following prisms that would hold the same amount: a cylinder, a rectangular prism of height 0.5m, an oval based prism with a base area of  $2.8\text{m}^2$ . Draw a diagram for each prism showing the dimensions and also clearly show your calculations.

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### Downloads

Student Worksheet

RTF

Excel Table for  
Worksheet

 .xls

Teacher Solutions

RTF

**Excel Solutions**



**Assessment  
Rubric**



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This page last updated 30 January 2014

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